CLAIMS

Sub B17

1. A pair of parent plants for producing seeds comprising:

(i) a first parent plant containing one or more gene sequences encoding a polypeptide or protein A: and

(ii) a second parent plant containing one or more gene sequences encoding a polypeptide or protein B;

wherein the polypeptides A, B, when expressed in separate plants, do not form an active enzyme, a regulatory protein or protein which affects the functionality and/or viability and/or the structural integrity of a cell, but when expressed in the same plant do form an active enzyme, regulatory protein, or protein which affects the structural integrity of a cell.

2. A pair of plants as claimed in claim 1 wherein the one or more gene sequences from at least one of the parents is transgenic.

A

3. A pair of plants as claimed in claim 1 ~~or claim 2~~ wherein the polypeptides or proteins A, B, when expressed in the same plant, cause cell ablation, especially male-sterility or embryoless seeds.

A

4. A pair of plants as claimed in ~~any one of~~ claims 1 ~~to 3~~ wherein one of the parent plants is male-sterile.

A

5. A pair of plants as claimed in ~~any one of~~ claims 2

to 4 wherein the one or more gene sequences encoding both or one of the polypeptides or proteins A, B, is operatively linked to a tissue specific promoter.

6. A pair of plants as claimed in any one of claims 1 to 5 wherein the polypeptides A, B are naturally occurring subunits of the protein complex of an active enzyme, regulatory protein, or protein which affects the structural integrity of a cell.

7. A pair of plants as claimed in claim 6 wherein the polypeptides A, B are two polypeptide subunits of an enzyme having RNase activity such as the enzyme Barnase or RNase A or the monomers of the protein complex of the Apelata3-pistillata.

8. A pair of plants as claimed in any one of claims 1 to 5 wherein the polypeptides A, B are artificially split polypeptides of an active enzyme, regulatory protein or protein which affects the structural integrity of a cell.

9. A pair of plants as claimed in any one of the preceding claims wherein each parent plant is homozygous with respect to the one or more gene sequences encoding polypeptide A or B respectively.

10. A pair of plants as claimed in any one of claims 3 to 9 wherein the cause of male-sterility is direct or indirect.

11. A pair of plants as claimed in any one of claims 5 to 10 wherein the tissue-specific promoter is a tapetum-specific promoter, an embryo-specific promoter or a seed

specific promoter.

12. A pair of plants as claimed in ~~any one of~~ claims 1 ~~to 11~~ wherein one or both of the polypeptides or proteins is fused ~~to~~ a carrier protein and/or a protein ~~targeting~~ signal.

13. ~~A pair~~ of plants as claimed in ~~any one of~~ claims 1 ~~to 12~~ wherein each polypeptide or protein A, B is linked to a protein dimerisation domain of a dimeric or multimeric protein sequence that promotes association of between subunits A and B.

14. A pair of plants as claimed in ~~any one of the preceding~~ claims 1 wherein the one or more gene sequences from at least one of the parent plants is a heterologous gene sequence.

15. A method for producing a plant having a desired phenotype by virtue of an active enzyme, a regulatory protein or a protein which affects the structural integrity of a cell, the method comprising crossing a first line with a second line wherein the first line contains one or more gene sequences encoding a polypeptide or protein but which line does not have the desired phenotype and wherein the second line contains one or more gene sequences encoding a polypeptide or protein B which is complementary to the polypeptide or protein A but which line does not have the desired phenotype.

16. A method as claimed in claim 15 wherein the one or more gene sequences from at least one of the lines is transgenic.

17. A method as claimed in claim 15 ~~or claim 16~~ wherein desired phenotype is cell ablation especially male-sterility or embryoless seeds.

18. A method as claimed in ~~any one of~~ claims 15 ~~to 17~~ wherein one of the lines is male-sterile.

19. A method as claimed in ~~any one of~~ claims 15 ~~to 18~~ wherein the one or more gene sequences encoding polypeptides or protein A and/or B is operatively linked to a tissue-specific promoter.

20. A method as claimed in ~~any one of~~ claims 15 ~~to 19~~ wherein the polypeptides or proteins A, B are naturally occurring subunits of an active enzyme, regulatory protein or protein which affects the structural integrity of a cell.

21. A ~~method~~ as claimed in claim 20 wherein the polypeptides or proteins A, B are two polypeptide subunits of an enzyme having RNase activity such as the enzyme Barnase, RNase A or the subunits of the protein Apelata3-pistillata.

22. A method as claimed in ~~any one of~~ claims 15 ~~to 19~~ wherein the polypeptides ~~or proteins~~ A, B are artificially split polypeptides of an active enzyme, regulatory protein or protein which affects the structural integrity of a cell.

23. A ~~method~~ as claimed in ~~any one of~~ claims 15 ~~to 22~~ wherein each line is ~~homozygous~~ with respect to the gene sequence encoding polypeptide or protein A, B,

respectively.

24. A method as claimed in ~~any one of~~ claims 15 ~~to 23~~ wherein the desired phenotypic trait is direct or indirect male-sterility.

25. A method as claimed in ~~any one of the~~ claims 15 ~~to 24~~ wherein the tissue-specific promoter is a tapetum-specific promoter, an embryo-specific promoter or a seed specific promoter.

26. A method as claimed in ~~any one of~~ claims 15 ~~to 25~~ wherein one or both of the polypeptides or proteins A, B is fused to a carrier protein and/or a protein targeting signal.

27. A method as claimed in ~~any one of~~ claims 15 ~~to 26~~ wherein each polypeptide or protein A, B is linked to a different protein dimerisation domain of a dimeric or multimeric protein.

28. A method as claimed in ~~any one of~~ claims 15 ~~to 27~~ wherein at least one of the lines contains, as the one or more gene sequences, heterologous gene sequences.

29. A seed or plant obtainable from a pair of plants as claimed in ~~any one of claims 1 to 14 or by a method as claimed in any one of claims 15 to 28~~ claim 1.

30. A seed or plant, having a phenotype of an active enzyme, regulatory protein or protein which affects the integrity of a cell, which is caused by the combined action of two or more transgenes, not present on the same copy of a chromosome.